

REMARKS

The above amendment with the following remarks is submitted to be fully responsive to the Official Action of March 31, 2004. Reconsideration of this application in light of the amendment and the allowance of this application are respectfully requested.

Claims 12-20 were pending in the present application prior to the above amendment. In response to the Office Action, claim 12 has been amended, claim 20 has been canceled and new claims 34 and 35 have been added. Therefore, claims 12-19, 34 and 35 are pending in the present application and are believed to be in proper condition for allowance.

Referring now to the Office Action, claims 12-20 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for the use of the term "type". In response thereto, independent claim 12 has been amended to recite a "closed nozzle fuel injector" thereby eliminating the term "type". Therefore, the withdrawal of this rejection relative to claim 12, and dependent claims 13-19 are respectfully requested, claim 20 having been canceled by the above amendment.

Referring again to the Office Action, claims 12, 19 and 20 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,053,432 to Stevens. Stevens discloses a fuel injector including a nozzle body, a bore that slidably receives a needle valve, and a collar extending around part of the nozzle body which restricts dilation or enlarging of the bore in at least part of the guide region. The Applicants respectfully disagree. In particular, it is noted that the collar disclosed in Stevens prevents dilation of the nozzle body which is caused by the application of high pressure fuel. In particular, the reference discloses that the collar serves to maintain the concentric positioning of the needle relative to the seat by applying a compressive force to the nozzle body so that the nozzle body can withstand the pressure exerted by the fuel without dilating. (See column 3, lines 14-33). Therefore, the invention disclosed in Stevens is directed to providing a solution for solving a mechanical deformation problem associated with the high pressure fuel that is injected by the fuel injector, and does not relate at all to improving the cooling characteristics of the fuel injector which is the problem addressed by the present invention. In this regard, the Examiner's attention is directed to the sole figure of Stevens, copy of

which is enclosed for convenience, in which a significant gap is present between the shank of the nozzle body 10 and the cap nut 19, this gap being indicated in the enclosed copy of the figure. As described in the Background section of the present application, such a gap allows hot combustion gases therein to increase the temperature of the tip of the fuel injector thereby decreasing reliability and performance of the fuel injector. In contrast, the present invention provides an interference fit of components to result in a sealed interface that prevents entry of combustion gas at the tip of the injector. (See claim 12). Therefore, contrary to the Examiner's assertion, Stevens fails to disclose a closed nozzle fuel injector with improved cooling as recited in the present claims.

However, to more clearly define the present invention and to expedite prosecution of the present application, independent claim 12 has been specifically amended to recite that the nozzle support portion of the tubular retainer is exposed at one end to a combustion chamber of the internal combustion engine, and that the outer peripheral surface of the nozzle support portion directly contacts the injector bore of the cylinder head and/or a coolant jacket sleeve installed in the injector bore. Clearly, Stevens reference fails to disclose, teach, or otherwise suggest these features when the collar is interpreted in the manner suggested by the Examiner in the present Office Action. Therefore, the withdrawal of this rejection relative to claims 12 and 19 are respectfully requested, claim 20 having been canceled by the above amendment.

Referring again to the Office Action, claims 13, 14, 16 and 17 were rejected under 35 U.S.C. as being unpatentable over Stevens discussed above. However, this rejection is believed to be rendered moot in view of the above amendments to independent claim 12, Stevens failing to teach or otherwise suggest the fuel injector as claimed. Correspondingly, the withdrawal of this rejection and the allowance of claims 13, 14, 16 and 17 are respectfully requested.

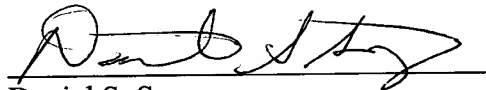
Finally, claims 12, 15 and 18 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,000,638 to Martin in view of Stevens discussed above. Martin discloses an apparatus for strengthening the injector tip member in which the tip member includes a further member 186 that annular surrounds the tip of the fuel injector, thereby minimizing the possibility of fracture or other failure of the injector tip. In a manner similar to Stevens reference discussed above, Martin reference addresses the

problem of mechanical strength of the injector tip so as to prevent failure by increasing the structural rigidity. In contrast, the present invention is directed to a closed nozzle fuel injector having improved cooling. In this regard, it is noted that Martin, like Stevens, is silent regarding improving cooling of the injector tip. In this regard, it is noted that the further member 186 disclosed in Martin would not serve to cool the injector tip. Moreover, even if Stevens and Martin are combined in the manner suggested by the Examiner, they fail to result in a fuel injector as now recited in the amended claim 12. In particular, the combination still fails to disclose a closed nozzle fuel injector having a retainer with a nozzle support portion that is exposed at one end to a combustion chamber, and where the outer peripheral surface of the nozzle support portion directly contacts the injector bore of the cylinder head and/or a coolant jacket sleeve installed in the injector bore. Therefore, the withdrawal of this rejection and the allowance of claims 12, 15, and 18 are respectfully requested.

New claims 34 and 35 have been added to define the present invention utilizing different claim language.

In view of the foregoing, it is submitted that the present application is in condition for allowance and a notice to that effect is respectfully requested. However, if the Examiner deems that any issue remains after considering this response, he is invited to call the undersigned to expedite the prosecution and work out any such issue by telephone.

Respectfully submitted,



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